Green Synthesis of Nanomaterials

Sustainable Nanotechnology Organization

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PRINCIPLES

- Reduce:
  - Waste prevention
  - Economically beneficial
  - Safer synthesis
  - Safer solvents
  - Less hazardous
  - Energy efficient
  - Derivatives

PRINCIPLES

- Reuse
  - Feedstock
  - Catalysis Reaction

PRINCIPLES

- Recycle
  - Smart degradation practices
  - Use of waste

Synthesis Methods

- Physical
  - Time & energy
  - High temperature & pressure
- Chemical
  - Simple
  - Low temperature
  - Inexpensive
  - Stabilizing/toxic reducing agents
- Green
  - Eco-friendly
  - Easy
  - Less energy/efficient

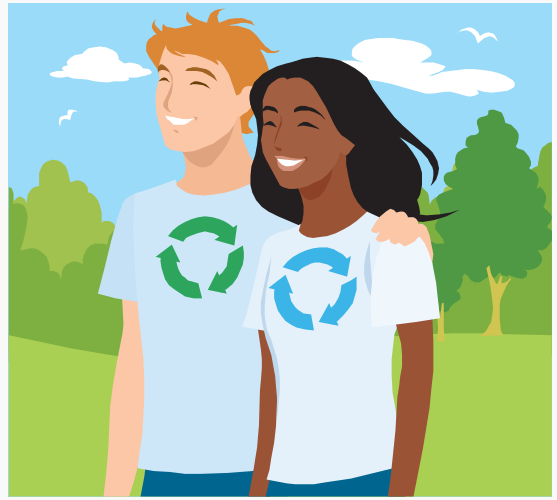
Good to be Green

- Rapid synthesis
- Controlled size characteristics
  - Via temperature, pH, mixing speed, substrate concentration, exposure time
- Controlled toxicity
- Economical
- Eco-friendly

Green Ways

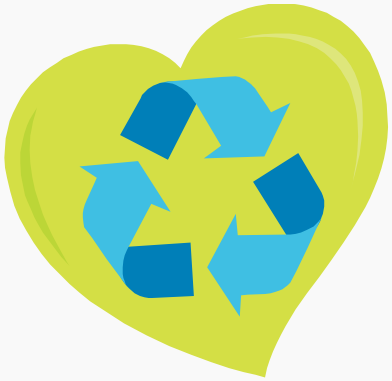
- Synthesis methods
  - Microorganisms
  - Enzymes
  - Plant extracts
  - Waste

FUTURE DIRECTION TO DEVELOP SAFE AND SUSTAINABLE USE OF ENMS:



•To provide sustainable decisions, combine manufacturer and research data in order to understand reactionary relationships and characterize their impacts.

•Improve analytical methodology in order to apply efficient and effective evaluations for risk assessment.



- Balance → Protect resources →Provide education
- Green development
- Know the end of shelf life/reuse/recycle

Simply put, we must save our future through community work of reducing, reusing and recycling.

NOTICE

"Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy."

Thanks!
For listening to the small talk

- Any curiosities?? And or concerns??
- Nano-nano!